Therapeutic cloning research and ethical oversight

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There should be government funding for therapeutic cloning research—and do we really need a moratorium on such research?

Abstract

Cloning Trevor, a story about therapeutic cloning research, appeared in the June issue of *The Atlantic Monthly*. The story gives a human face to the people whom therapeutic cloning could benefit. It presents an argument for government funding and it puts the usual calls for a moratorium on embryonic stem cell research to allow for more debate, in a less favourable light. The story also highlights some problems with ethical oversight.

With access to Advanced Cell Technology (ACT), a biotechnology company doing therapeutic cloning, science writer and former biotech researcher Kyla Dunn followed the case of Trevor Ross, a two year old boy with a devastating genetic disease, and Advanced Cell Technology's experimental work and efforts to help him. The appeal of the story is that it gives a human face to the people whom therapeutic cloning could benefit. The story is true but the names of Trevor and his family have been changed.[1]

Advanced Cell Technology (ACT) is a privately owned company and the only group in the US "openly pursing human therapeutic cloning research". After approaching the company, Dunn wrote:

> I wanted to know what motivated ACT's scientists. I wanted to observe firsthand what was happening in their cloning lab. I wanted to meet ordinary people afflicted with illness for which therapeutic cloning represented a potential cure. And, perhaps most important, I wanted to understand what happens to scientific progress when the burdens of research and development in an ethically sensitive area like cloning fall on the private sector rather than on the government.[2]

Trevor Ross and two of his cousins have X-linked adrenoleukodystrophy (ALD) a devastating, often fatal condition. Trevor's cousin Andrew was the first affected. Andrew was described as a bright boy who loved baseball, played the violin, and apart from being "given a diagnosis of attention deficit hyperactivity disorder"when he started kindergarten, seemed to be thriving.[3] But Andrew began having cognitive problems and by the time he was 8 years old he suffered a dramatic and progressive loss of coordination and it was clear there was something terribly wrong. With "alarming swiftness" after his ALD was diagnosed, he went blind and deaf, lost motor and bowel control and was unable to speak or move. This occurred by the time Andrew was nine.[3]

Both Trevor and Andrew's seven year old brothers also have the gene for ALD. Childhood cerebral onset of ALD affects mainly boys and half of those who develop childhood cerebral onset are dead by the time they are nine. Current treatment for ALD is a bone marrow or umbilical cord blood transplant but compatible donors are extremely hard to find and the transplants do not always take. A quarter of the boys who receive a bone marrow transplant "die from complications related to the procedure".[3]

Treatment could not help Andrew because his condition had deteriorated too far. There was, however, still hope for Trevor. Trevor was less than a year old when he was diagnosed and he had not yet shown any signs of brain deterioration. Neurological symptoms of ALD rarely develop in children under the age of three and many develop normally until the age of seven. It seemed that Trevor might have a while before the need for conventional but risky treatment so Trevor's parents sought out ACT in the hope that an experimental treatment using human embryonic stem cells could be developed to create a transplant that Trevor's body would not reject.[3]

In *Cloning Trevor*, Dunn writes about the ACT scientists' efforts to try to create cloned embryos with Trevor's skin cells. She describes the ordeal of getting two mature eggs and the painstaking work of trying to fuse the empty eggs with Trevor's skin cells. First of all, the eggs have to be donated and retrieved from young women. Then the scientist has to remove the chromosomes from the eggs by carefully piercing the egg's outer membrane and by applying suction to remove the cytoplasm. A skin cell is drawn into a needle and inserted into the egg and a pulse of electricity is used with the hope of fusing and activating the egg.[4]

Unfortunately both eggs lost their outer membranes and became unusable: the months of hoping and waiting came to nothing.[4] In a "last ditch effort to save the eggs", after conferring briefly, the team tried to transfer the human eggs into empty cow eggs from the cow cloning lab—but that also failed.[5]

For Trevor, all hope of developing an experimental cure was finally dashed, when in February 2002 signs of childhood cerebral onset of ALD were detected.[6] In April, after ten days of chemotherapy, Trevor had a conventional umbilical cord blood stem cell transplant.[7]

In *Cloning Trevor*, Dunn concludes that "real progress" in therapeutic cloning requires government funding and support. While there is a ban on federal funding the companies doing therapeutic cloning research will be private companies like ACT "which, despite generally noble intentions, are bedevilled by the need to raise money, generate buzz, and please investors".[6] The "importance of federal funding cannot be overstated" Dunn argues. Government funding "attracts talented researchers at universities and research institutes" and with that "comes ethical oversight and peer review, ensuring that experiments are well designed, conducted by qualified scientists, and targeted at pressing questions in the field".[7] Dunn makes no overt criticisms of ACT but neither does she shirk from reporting aspects of their research that are likely to attract criticism.

Some people see ACT's experimental work in a less favourable light than Dunn. The company generated considerable criticism and controversy in November 2001 when it announced prematurely that it had the world's first cloned human embryos. ACT was accused of harming the progress of therapeutic cloning research. According to an editorial in *The New York Times*, "by rushing into print with such preliminary results, and orchestrating a media blitz to accompany the announcement, Advanced Cell Technology has invited legislative retaliation that could cripple the very research it is attempting to pioneer". The

company's motives have also been questioned: "Biotechnology companies are dependent on investors, and investors like publicity".[8]

Another controversy in which ACT is embroiled relates to the suspicion and mistrust generated by companies having their own private ethics advisory boards. Although private companies such as ACT are not required to have ethics advisory boards, ACT does have one. It has been called "window dressing for a corporate marketing plan".[9] Nevertheless, the reasoning of ACT's board shows that this particular advisory board is not "window dressing" in the sense that it exists only to legitimise the company's research. It could be argued, however, that the board's idiosyncratic reasoning does not amount to ethical review—rather, it shows how muddled reasoning can impede beneficial research.

One of the "leading ACT scientists" is said to have asked its ethics advisory board if there was any type of person who should be ruled out as a tissue donor for nuclear transfer research: "What about a child" he asked. Federal regulations permit research involving children as long as it provides knowledge that is likely to be of "vital importance" in understanding or ameliorating that child's disorder, and non-therapeutic research is allowed as long as the research is only "a minor increase over minimal risk".[10] At first the board was unable to come up with any class of donor that was unacceptable, but in relation to the question of children as donors most felt a "hunch" that "there was something disturbing about this possibility". Then, "on reflection" the board "quickly and unanimously concluded" that a cell line derived from a child "could not be used in therapeutic cloning research":

Imagine that twenty years from now, when the child has grown up, she becomes an ardent "right to life" proponent. She firmly believes that life begins at conception or as soon as there is a self replicating genome. She learns that when she was very young, her parents took a skin cell from her that was used to create a cloned embryo. This embryo was later destroyed for research purposes. The young adult now feels that, without her knowledge or consent, she was made party to morally offensive acts.[10]

On this reasoning, if the procedure had been perfected, Trevor could not be helped because of a wrong that *might* be done to him if "years from now" he comes to hold a rigid minority view about the sanctity of life that interprets the attempt to save him as a "morally offensive" act. No consideration is given to the likelihood or gravity of harms and benefits.[11]

A report by the US President's Council on Bioethics was released on 11 July 2002. It recommends that cloning for biomedical research be prohibited during a four year moratorium.[12] Patient advocates and scientists view the moratorium "as tantamount to a ban". They claim that the council was "stacked from the beginning" with those who oppose cloning research and that the outcome might have been different if the panel had included an advocate for patients.[13] It is unclear how the report's recommendations will affect therapeutic cloning research in the private sector.[14]

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2 **See reference 1: 33**.
3 **See reference 1: 36**.
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7 **Interview**. The life (and death?) of cloning. *Atlantic Unbound* (*The Atlantic Monthly*'s online journal) 2002 May 22. Kyla Dunn, the author of *The Atlantic Monthly*'s June cover story, talks about the state of therapeutic cloning research and why it should not be banned. at www.theatlantic.com/unbound and follow the links to inteviews (accessed 15 July 2002).
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9 **Green R**, DeVries K, Bernstein J, *et al*. Overseeing research on therapeutic cloning: a private ethics board responds to its critics. *Hastings Cent Rep* 2002;**32**:27–33. This is an article written by the ACT ethics board.
10 **See reference 9: 31**.
11 **See reference 9**. This article written by the ACT ethics advisory board appeared in the May/June issue of the *Hastings Center Report*. It is a response to its critics and to the criticism that a private ethics board's advice can go unheeded. The board refers to the consent forms for the donors of somatic cell tissue as an example of one incident in which researchers ended up implementing the board's recommendations even though the recommendations impeded or slowed research. The article describes the ACT scientist as "crestfallen" when he heard the board's conclusion. It is not clear when this article was actually written and it contains no reference to the work done with Trevor's skin cells but it seems that ACT did disregard its ethics advisory board in this matter.
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Withholding artificial feeding from the severely demented: merciful or immoral? Contrasts between secular and Jewish perspectives

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According to Jewish law, to make a judgment that a life has no purpose and is not worth saving is contrary to the concept of justice

Traditional medical practice dictates that when patients are unable to eat or drink enough to sustain their basic nutritional requirements, artificial feeding and hydration is indicated. Common clinical examples of this problem are patients with senile dementia and those in a persistent vegetative state (PVS). In recent decades, however, the practice of mandating artificial feeding has been increasingly questioned. A combination of legal, ethical, and clinical considerations has resulted in broad support for withholding and withdrawing artificial nutrition. The guiding ethical principle in the current clinical standards is that patient autonomy must be honoured. In the context of an incompetent adult (such as a patient with advanced dementia or in a PVS), advance directives or surrogate decision making are legally binding. Such